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AD-A224 826

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NAME OF CONTRACTOR: Paul M. Raccach
CONTRACT NUMBER: DAAK 70-83-K-0047
EFFECTIVE DATE OF CONTRACT: 2/1/83
EXPIRATION DATE OF CONTRACT: 1/31/86
REPORTING PERIOD: SECOND QUARTER [Part One]
PRINCIPAL INVESTIGATOR: PAUL M. RACCAH
PHONE NUMBER: (312) 996-3403

" Plasma Passivation of Selected MCT Samples
Pt. 1

THE VIEWS AND CONCLUSIONS CONTAINED IN THIS DOCUMENT ARE THOSE OF THE
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DISTRIBUTION STATEMENT A

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Distribution Unlimited

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NVL - SAMPLE DATA

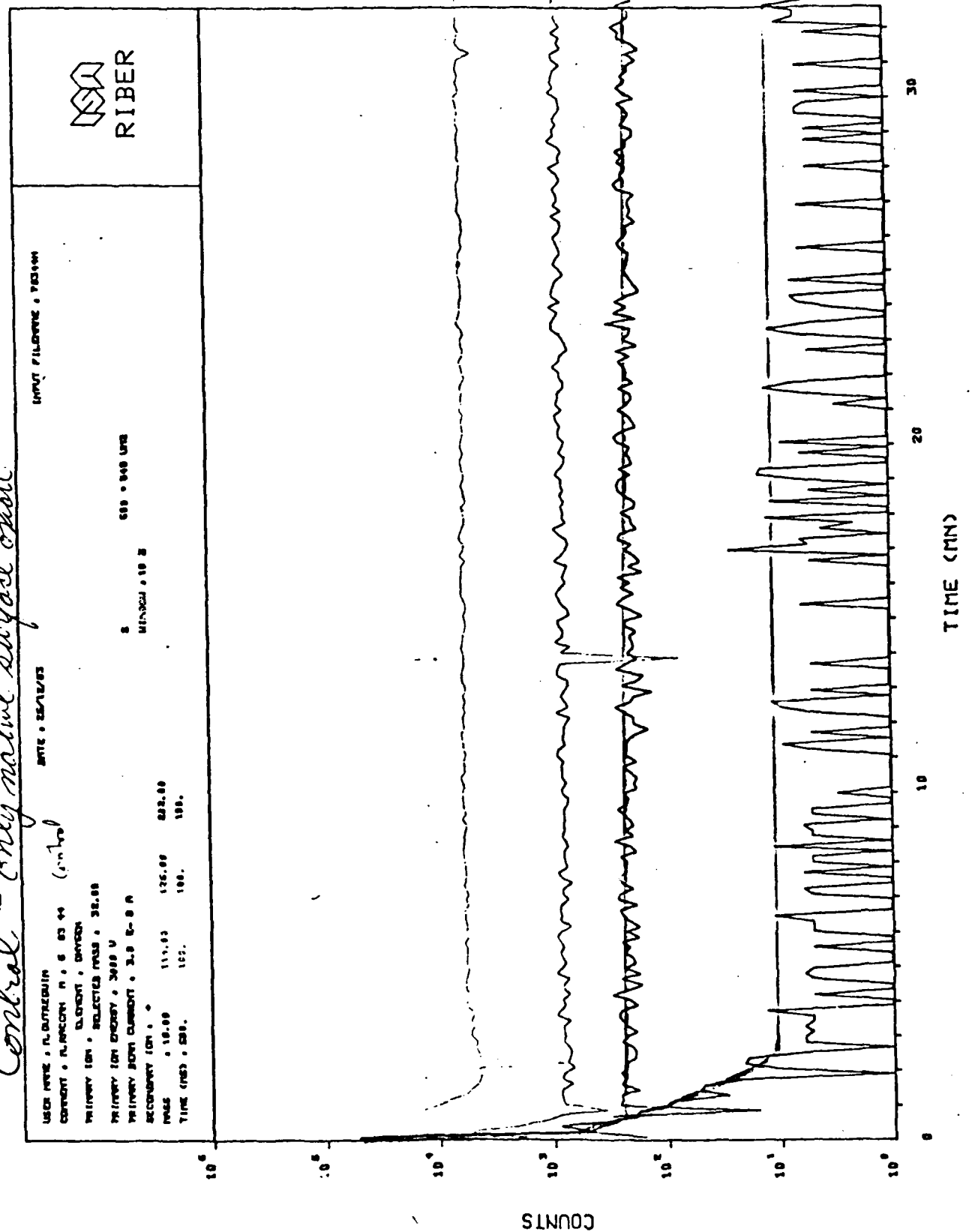
Plasma Conditions: 60 watts RF power
+40 VDC sample bias
.5 torr O₂

Samples:

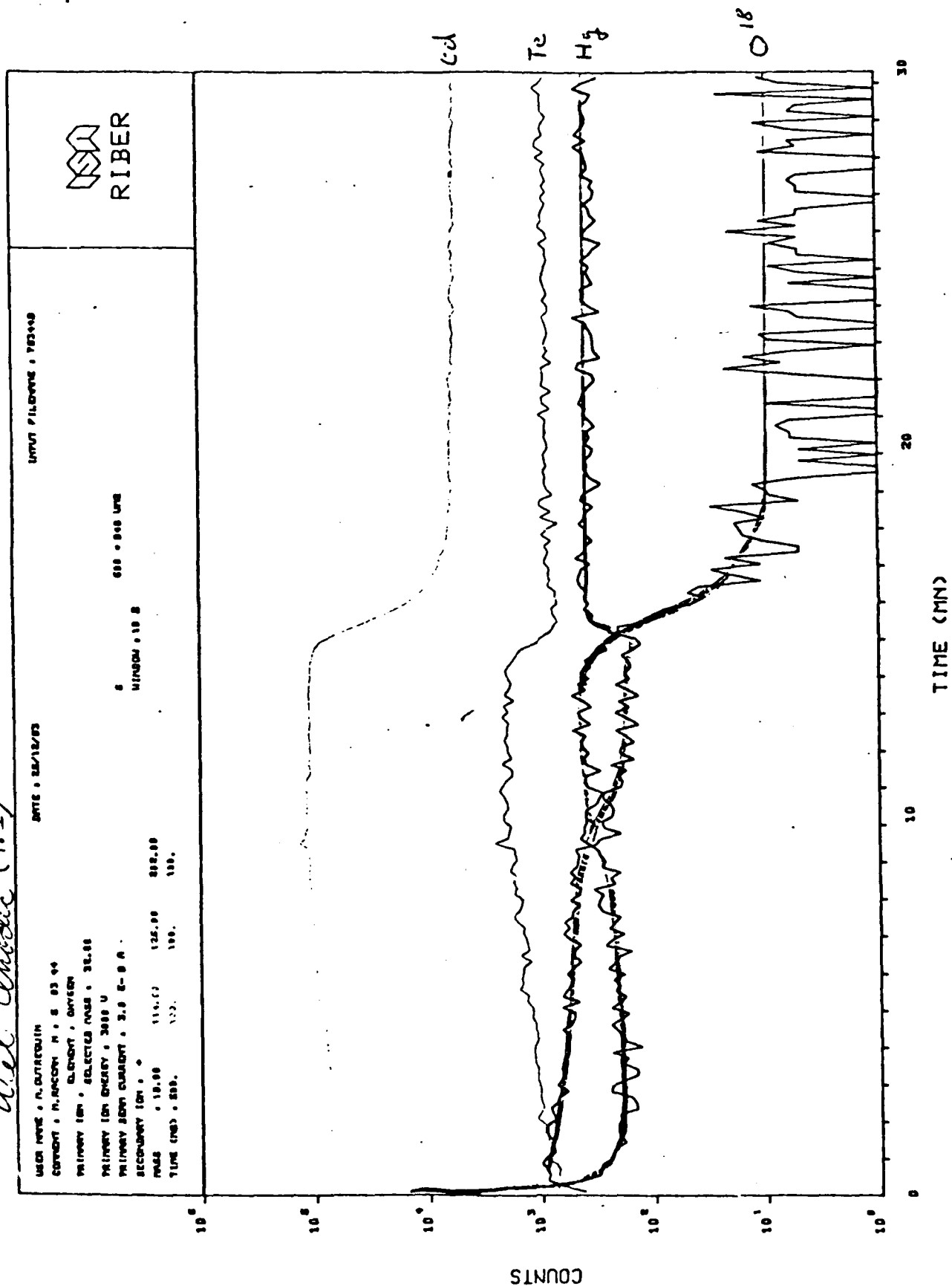
- #1 488Å Plasma oxide on LPE
6 min. growth time
Rockwell #5-271B LPE - (111), $\lambda = 3.87 \mu\text{m}$, 25-28 μm thick
p-type, $4.8 \times 10^{16}/\text{cm}^3$ @ 77K
mobility $238 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .32 \pm .01$ (by EER)
- #2 445Å Plasma oxide on Bulk
5 min. growth time
Cominco #15(321)-10B - (111), Bulk
n-type, $-2.7 \times 10^{15}/\text{cm}^3$ @ 300K
 $-1.7 \times 10^{14}/\text{cm}^3$ @ 77K
mobility $5.6 \times 10^3 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 300K
 $6.4 \times 10^4 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .295 \pm .05$
- #3 a 237Å Plasma oxide on LPE
2 min. growth time
- b 363Å Plasma oxide on LPE
6 min growth time
Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, 20 μm thick
n-type, $-1.1 \times 10^{14}/\text{cm}^3$ @ 77K
mobility $1.4 \times 10^5 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .2$

SIMS DATA

Control - only native surface oxide



Wet Anodic (T.I)



#1 488Å Plasma oxide on LPE (by ellipsometry)

6 min. growth time

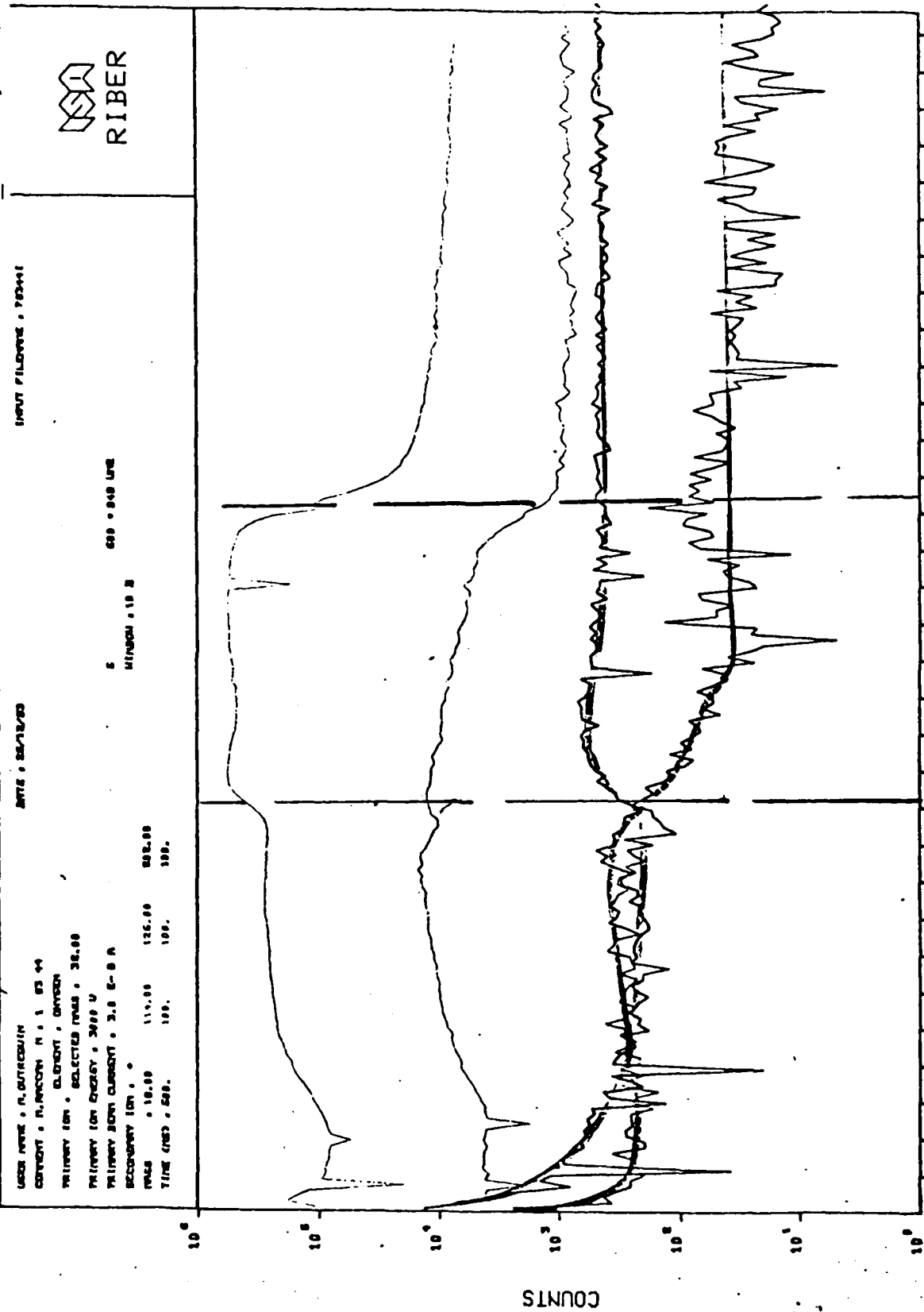
Rockwell #5-271B LPE - (111), $\lambda = 3.87 \mu\text{m}$, 25-28 μm thick

p-type, $4.8 \times 10^{16} \text{ cm}^{-3}$ @ 77K

mobility $238 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ @ 77K

$x = .32 \pm .01$ (by EER)

Sample #1



Sample #2

USER NAME : N. OUTREQUIN
 CONTINUT : N. JANCION N. 2 93 44
 PRIMARY ION : ELEMENT : OXYGEN
 PRIMARY ION ENERGY : 32.00
 PRIMARY BEAM CURRENT : 3.0 E-8 A
 SECONDARY ION : +
 PULS : 10.00 114.00 125.00 895.00
 TIME (MS) : 500. 100. 100. 100.

DATE : 25/12/83

INPUT FILENAME : P8344E



RIBER

600 - 910 UNE
 WINDOW : 10 B

#2 445Å Plasma oxide on Bulk (by ellipsometry)

5 min. growth time

Cominco #15(321)-10B - (111), Bulk

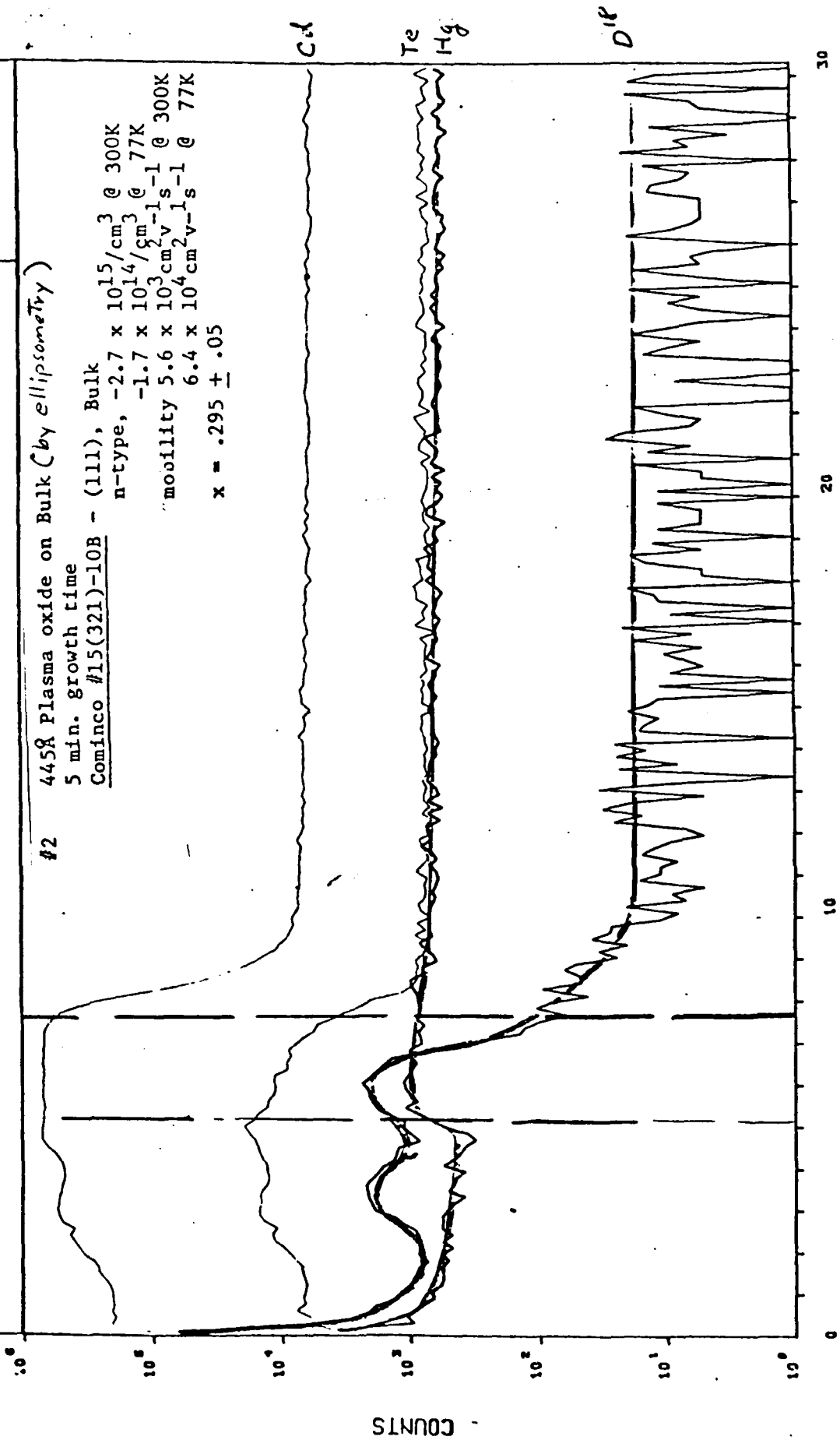
n-type, $-2.7 \times 10^{15}/\text{cm}^3$ @ 300K

$-1.7 \times 10^{14}/\text{cm}^3$ @ 77K

mobility $5.6 \times 10^3 \text{ cm}^2/\text{V} \cdot \text{s}$ -1 @ 300K

$6.4 \times 10^4 \text{ cm}^2/\text{V} \cdot \text{s}$ -1 @ 77K

$x = .295 \pm .05$



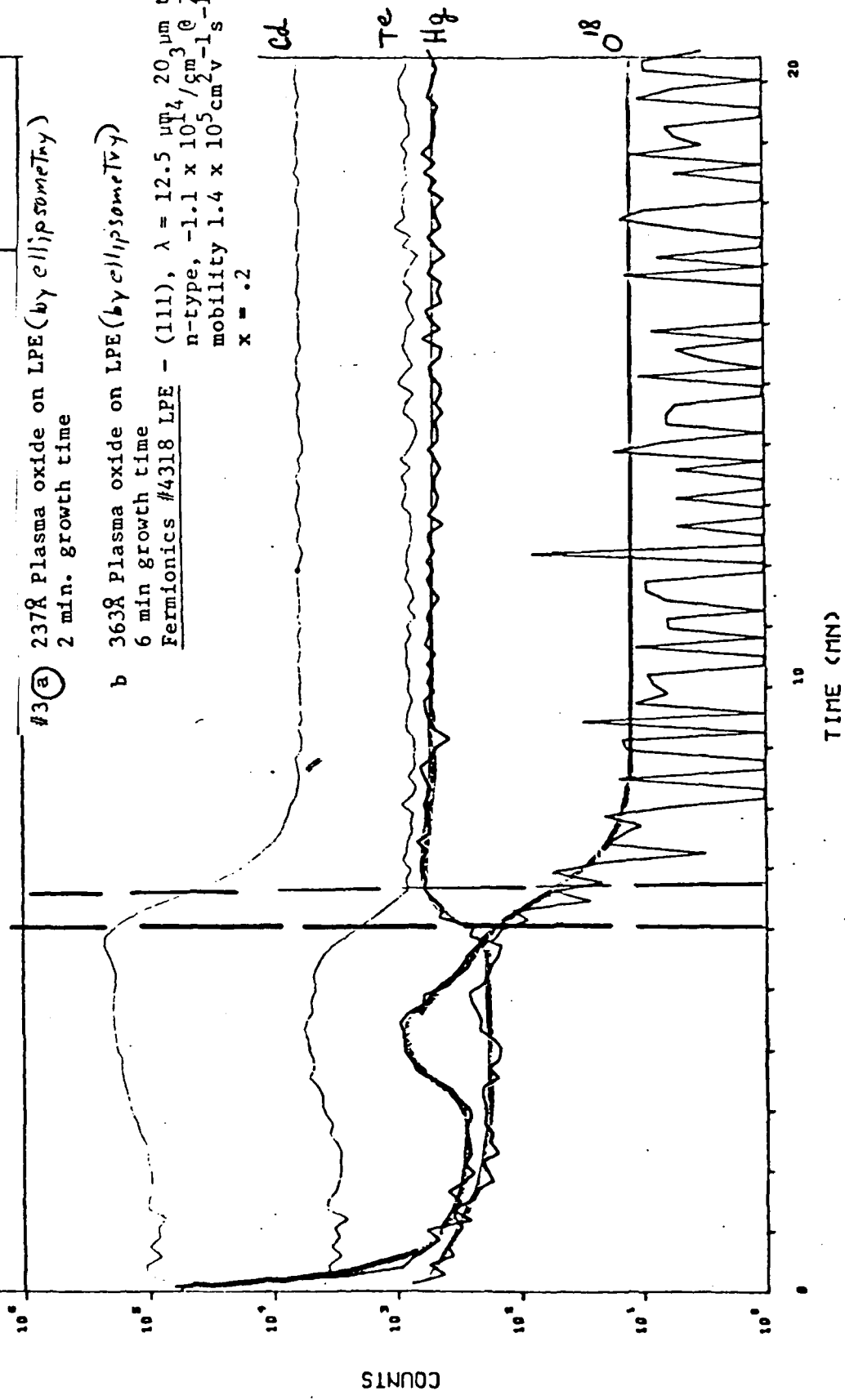
TIME (MIN)

Sample #3A


BECH NAME : R. OUTREQUIN COMMENT : PLASMA ON LPE PRIMARY ION : ELECTRON PRIMARY ION ENERGY : 3000 U PRIMARY ION CURRENT : 2.0 E-8 A SECONDARY ION : PEAK : 10.00 11.00 12.00 13.00 TIME (MS) : 500. 100. 100. 100.		DATE : 25/12/83 INPUT FILENAME : P231A2 600 * 800 LINES WINDOW : 10.0	
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#3a 237Å Plasma oxide on LPE (by ellipsometry)
 2 min. growth time

b 363Å Plasma oxide on LPE (by ellipsometry)
 6 min growth time
 Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, $20 \mu\text{m}$ thick
 n-type, $-1.1 \times 10^{14} / \text{cm}^3$ @ 77K
 mobility $1.4 \times 10^5 \text{ cm}^2 / \text{V} \cdot \text{s}$ @ 77K
 $x = .2$



Sample #3B

USER NAME : R. BURTON COMMENT : R. BURTON N. 32 02 44 PRIMARY ION : ARGON SELECTED PASS : 32.00 PRIMARY ION ENERGY : 3000 V PRIMARY ION CURRENT : 3.0 E-8 A SECONDARY ION : PASS : 10.00 TIME (MIN) : 500.		DATE : 02/12/73 INPUT FILENAME : P0310K WINDOW : 10.0 600 - 900 WPM	 RIBER
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#3 a 237Å Plasma oxide on LPE (by ellipsometry)
2 min. growth time

(b) 363Å Plasma oxide on LPE (by ellipsometry)
6 min growth time

Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, $20 \mu\text{m}$ thick
n-type, $-1.1 \times 10^{14} / \text{cm}^3$ @ 77K
mobility $1.4 \times 10^5 \text{ cm}^2 / \text{V} \cdot \text{s}$ @ 77K
 $x = .2$

